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Preparing and Administering Intramuscular Injections
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Preparing and Administering Intramuscular Injections

Overview:

Intramuscular (IM) injections deposit medications deep into the muscle tissue. Since muscle fibers are well perfused, this route of administration provides quick uptake of the medication and allows administration of relatively large volumes. The skeletal muscles have fewer pain-sensing nerves than subcutaneous tissue, which allows for less painful administration of irritating drugs. IM injections are recommended when the patient is unable to take oral medications and for uncooperative patients. Some examples of medications that are commonly delivered by IM injections include antibiotics, hormones and vaccinations.

As in any other route of administration, the nurse must consider if the medication is appropriate given the patient's medical conditions, allergies and current clinical status. In addition, specifically for intramuscular injections, it is important to assess the patient's muscle mass to determine appropriate needle size. Also, if the patient has already received this injection, then verify which injection site was previously used and make sure that previous dose didn't result in adverse reactions.

The sites that are most commonly utilized for IM injections include the shoulder's deltoid muscle, the thigh's vastus lateralis, and the hip's ventrogluteal, gluteus medius, or dorsogluteal muscles. It is recommended to avoid administering intramuscular injections into the dorsogluteal muscle, because this location has an increased risk of hitting a blood vessel, nerve, or bone.

The video will focus on the essential steps that every nurse should follow in order to correctly prepare and administer an intramuscular injection.

Procedure:

1. Similar to any other route of administration, preparing and administering intramuscular medications requires the nurse to be knowledgeable about the patient's medical history and previous administration times, medication allergies, medication purpose, adverse effects, and patient preferences. All this information can be obtained by discussing with the patient and by reviewing the MAR at the patient bedside.

2. In case of intramuscular injections, the nurse should be particularly aware about the patient's preference for an intramuscular injection site and the administration process (does the patient prefer a particular site? Do they prefer you to count down to administration or to swiftly administer it?).

Commented [AS1]: Word to word from the suggested two paragraphs.

3. Select the most appropriate site for intramuscular injection depending on the type of medication being delivered.

3.1. ~~Larger volumes of medication should be given in the hip area, in area~~ such as the gluteal muscles, ~~are preferred for administration of larger volumes of medications,~~ while small volumes can be given in the arm ~~site, a such as the~~ deltoid muscle. ~~The deltoid site is mostly commonly used for immunizations. Common deltoid medications are immunizations,~~ however ~~any medication less than up to~~ 1 mL of any medication may be given ~~administrated in this muscle as well (although~~ maximum volume should never exceed 2 mL ~~)L's. Common medications given in the Gluteal musclesite is commonly used to administer s~~ are antibiotics, or any medication, ~~when the that exceeds~~ volume exceeds 2 mL's ~~but less than~~ 3mL for an adult. ~~Research in intramuscular~~ Many providers consider the ~~injections refers to the~~ ventrogluteal muscle as the preferred site for IM injection based on the large muscle mass and increased absorption when larger than 2 mL volumes are ~~injected in the area used.~~ (Figure 1)

Commented [AS2]: What would be more accurate – below 1mL or below 2mL?

Commented [AS3]: This information was in the conclusion paragraph

Commented [AS4]: The data on the subject still seems controversial. I think this can be clarified later with the authors.

3.2. Infants should receive all intramuscular medications in the vastus lateralis because it is the largest muscle at that developmental age.

3.3. Avoid administering intramuscular injections into the dorsogluteal muscle, because this location has an increased risk of hitting a blood vessel, nerve or bone.

4. Adherence to the five rights – right patient, right medication, right dose, right route, right time - at three check-points of the safe medication administration process is imperative to prevent patient injury and harm. In order to learn about these five-rights in detail, please refer to the video titled "Safety Checks for Acquiring Medications from a Medication Dispensing Device". Remember to wash or sanitize your hands before and after each patient encounter. Vigorous friction for at least 20 seconds should be applied while washing hands with soap and warm water or while applying hand sanitizer.

5. Upon entering the medication preparation area (this area may be in a secured room or in a secured portion of the nurses' station) complete the first safety check using the 5 rights of medication administration (Refer to the video "Safety Checks for Acquiring Medications from a Medication Dispensing Device").

Preparing the intramuscular injection

Intramuscular injection preparations are commonly provided in vials or ampules for withdrawal to a syringe. Before withdrawing, it is important that a nurse calculates the volume of the medication to be administered according to the concentration provided on the container.

6. In the medication preparation area, prepare the intramuscular injection according to the MAR, nurse drug guide, best practices and institutional policies/procedures by removing the medication from the box and removing the vial top.

6.1 ~~S-As with other vial preparations,~~ scrub the medication vial with an alcohol prep pad for 20 seconds with friction and intent while watching a wall clock or watch.

6.2 Using aseptic techniques attach the blunt tip needle to the syringe, remove the cap, and withdraw the appropriate amount of medication for injection. ~~Note~~ Assess the viscosity of the liquid while withdrawing the medication from the vial. This will help to determine the size of needle needed for muscular injection.

6.2.1 ~~HA~~ s with any medication withdrawal from a vial, the medication should be held the vial at eye-level and the needle tip below the level of medication to ensure the correct amount of liquid is withdrawn and air bubbles are avoided.

6.3 If at any time during medication withdrawal the needle hub, needle cap, or syringe connection point is contaminated from contact with hands or countertop, ~~be sure and~~ obtain new supplies and restart the medication preparation procedure.

6.4 Engage the blunt tip needle safety device or replace the cap using the scoop method (placing the needle cap on the flat surface and sliding the needle into it) to avoid accidental needle sticks. ~~Then~~ then discard the blunt tipped needle in an approved sharps container. ~~Maintain~~ Be sure and maintain sterility of the syringe containing the medication.

6.5 Attach the appropriate sized needle for muscular injection to the syringe using aseptic technique. The gauge of the needle should be between 18 and 25, and length between 5/8 - 1½ inch. Needle selection is dependent upon the age of the patient, administration site, volume of fluid, amount of muscle and adipose tissue, and viscosity of the solution.

Commented [A55]: Elaborated below in 6.5.1 and 6.5.2

6.5.1 Large bore needles (18 and 20 gauge) are appropriate for thick, viscous medications while small bore needles (22 and 25 gauge) are appropriate for thinner medications and infants.

6.5.2 Long needles (1 inch and 1½ inch) are most often used for patients with large amounts of adipose tissue covering the muscle site in order to reach the muscle tissue or for deep muscles such as the ventrogluteal muscle. Shorter needle lengths (5/8 inch and ½ inch) are appropriate for thin patients and pediatric patients to avoid needle sticks into bone.

6.5.3 If injecting medication into the deltoid muscle of an adult, the volume of solution should not exceed 1 mL.

6.5.4 If injecting into the vastus lateralis, ventrogluteal, gluteus medius, or dorsogluteal muscles of an adult, the volume should not exceed 3 mL's.

6.5.5 If administering an intramuscular injection into a child under age 2, the maximum amount that should be administered is 1 mL.

6.6 ~~LA~~ s with all medication administration, label the medication with the medication name and dosage amount then discard packaging materials in a trash receptacle. Note that some institutions may require more information according to their medication labeling policy.

7. In the medication preparation area complete the second safety check using the 5 rights of medication administration. (Refer to the video "Safety Checks for Acquiring Medications from a Medication Dispensing Device")

8. In addition to the intramuscular medication to be administered, be sure to obtain all the supplies needed for injection before going into the patient's room. These include such as an alcohol prep wipe, non-sterile gloves, and adhesive bandage or a cotton ball and silk/paper tape.

Administration

9. Wash hands when entering the patient room and complete the third, and final, medication safety check adhering to the 5 rights of medication administration. (Refer to the video "Preparing and Administering Oral and Liquid Medications")

Prepare the patient and administer the intramuscular medication

10. As with any medication administration, remind the patient of the medication purpose, any adverse reactions, and go over the administration procedure.

11. Remove bed linens and patient gown or clothing to access the selected injections site. Use injection site selection as described in step 3, with deltoid muscle preferred for small volumes and ventrogluteal for large volumes in adults. (Figure 1)

11.1. When delivering small volumes, such as immunizations, in the deltoid muscle, locate the acromial process at the top of the shoulder as your landmark. Mark two fingerbreadths down from the acromial process and envision an inverted triangle. Needle insertion should be in the center of the inverted triangle. (Figure 2)

Commented [AS6]: Please elaborate more on this point, do you mark the site with the pencil, how is this triangle formed, etc

11.2. When delivering larger volumes injections such as antibiotics into the ventrogluteal muscle, have the patient lay comfortably on their side with selected hip exposed. Find the greater trochanter and the iliac crest as landmarks. Place the palm of your hand, with the thumb pointing to the front of the patient, on the greater trochanter; point the index finger at the anterior iliac crest, then spread the middle finger toward the back of the patient forming a "V". The needle injection site is located between the knuckles of the index and middle fingers. (Figure 3)

12. Clean gloves should be donned at this time, taking care to assess if the patient has a latex allergy, or use non-latex gloves to avoid allergic reactions.

12.1. According to the CDC, it is unnecessary to clean the injection area with an alcohol prep pad unless the skin is visibly soiled or dirty.

13. The z-track technique for IM administration should always be used. The z-track technique prevents medication from leaking into the subcutaneous tissue. Hold the syringe in your dominant hand, and with your non-dominant hand, remove the needle cap.

13.1. Using the non-dominant hand, pull the skin taut between the thumb and forefinger, pushing adipose tissue approximately 1 inch away from the muscle. (Figure 4)

13.2. ~~The Insert the needle~~ needle should be inserted at a 90° angle. Hold the syringe between thumb and index finger of the dominant hand and insert into the muscle using a quick, purposeful motion.

13.2.1. VARIATION: When administering some IM medications (this does not include vaccinations), into the ventrogluteal, gluteus medius or the dorsogluteal muscles, it is recommended to aspirate for blood return. This prevents accidental administration of the medication into a blood vessel. This is not necessary for deltoid or vastus lateralis muscles because they do not contain large blood vessels.

13.2.2. To aspirate, hold the syringe between the thumb and middle finger, and gently push up the plunger with the forefinger. If you see a blood return in the syringe, remove the needle from the site and begin the process again selecting a different IM administration site.

13.3. Using the thumb or index finger of the dominant hand, press the plunger slowly to inject the medication at a rate of 10 seconds per mL. You may stabilize the syringe into the skin with the fingers of the non-dominant hand, and using the dominant hand push down the plunger with the index finger or thumb.

14. As with any injection, remove the needle smoothly along the line of insertion, engage the safety device with the thumb of the dominant hand, and immediately place the needle and syringe directly into a "sharps" container.

15. Again, if blood is present after injection, apply an adhesive bandage or cotton ball with silk/paper tape.

16. Replace all clothing and bed linens according to patient preference.

17. Finally, dispose gloves and waste into garbage receptacle and wash hands with soap and water for at least 20 seconds with vigorous friction.

18. As with any medication, document medication administration of date, time, and location of administration in the electronic MAR.

18.2. Variation: Immunizations may require additional documentation depending on facility policy.

19. Prior to leaving the room, remind the patient about any side effects/adverse effects associated with IM injections such as pain at the site, redness, bruising, or swelling. These should be immediately reported to the nurse.

20. Leave the patient room wash hands with soap and water for at least 20 seconds with vigorous friction.

Summary

This video demonstrates the preparation and administration of intramuscular medications. According to best practice intramuscular medications should be administered in the deltoid

muscle for immunizations or medications less than 1 mL but not to exceed 2 mL's. Large volumes more than 2 mL's but less than 3 mL's should be administered in the ventrogluteal muscle, such as antibiotics. Common errors in intramuscular medication administration include administering large volumes in the deltoid muscle or using the gluteal muscle causing the medication and needle to hit a nerve, bone, or adipose tissue. Another common error is using long needle lengths in patients with small amounts of muscle tissue, also increasing the chances of hitting bone tissue and causing osteomyelitis. As with any injection, failure to create a taut surface and hesitating with the injection resulting in needle tip contamination or recapping a used needle potentially resulting in a nurse "needle stick" injury can occur, therefore strict adherence to safe needle practices should always be enforced.

Figures & Legends

Figure 1: Intramuscular Injection Sites

Appropriate Injection Sites for Intramuscular Medication Administration

Figure 2: Deltoid Injection Location

Appropriate Injection Site for Deltoid Muscle with Landmarks

Figure 3: Ventrogluteal Injection Location

Appropriate Injection Site for Ventrogluteal Muscle with Landmarks

Figure 4: Z-Track Technique

Appropriate z-track of adipose tissue away from muscle injection site

References

Institute of Medicine. (1999). *To err is human*. Washington, DC: Academic Press.

Center of Disease Control and Prevention (CDC). U.S. Department of Health & Human Services.

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